EPA comments on March 17, 2011 BHHRA risk tables and calculations

EPA appreciates the opportunity to review the tables and calculations for the combined child and adult scenarios, the evaluation of polybrominated diphenyl ethers, and infant exposure to bioaccumulative chemicals via breast milk. With the exception of the specific comments provided below, the information presented in tables is comprehensive and clearly presented.

1. Per EPA Specific Comment 52 on the draft Portland Harbor BHHRA, the tables should be revised to note whether a Central Tendency Exposure (CTE) or a Reasonable Maximum Exposure (RME) exposure scenario is presented. Accordingly, in all instances "95% UCL/Maximum Exposure Scenario" should be changed to "RME" in the title. EPA agreed that actual exposure point concentrations could be referred to specifically on the basis of the value they represented (arithmetic mean, 95 percent upper confidence limit on the arithmetic mean, or the maximum detected concentration), but that the exposure scenarios would be referred to as either CTE or RME as consistent with EPA risk assessment guidance and policy.

2. A spot check of calculated cancer risks for the combined child/adult receptors indicates risks are calculated correctly, and that age-dependent adjustment factors (ADAFs) have been used when estimating the risk associated with early-life exposures to carcinogenic polynuclear aromatic hydrocarbons (cPAHs). However, calculated cancer risks for child receptors aged 0-6 years do not appear to have incorporated ADAFs for the specified age range when estimating risks from cPAHs. The LWG indicated in its November 18, 2010 responses to EPA comments that ADAFs would included in both the child (0-6 years) and the combined child-adult scenarios, and the calculations need to be revised to reflect this agreement.

3. In the footnotes for the combined child/adult cancer risk tables, the proper reference for the ADAFs is EPA's *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*, Risk Assessment Forum, March 2005, EPA/630/R-03/003F, not OR DEQ guidance as currently shown in the tables.

4. It appears that risk and hazard estimates from exposures to polybrominated diphenyl ethers (PBDEs) are to be presented entirely in an attachment to the revised BHHRA. EPA requested that PBDE risk and hazard estimates be included to provide a full characterization of the risks associated with contamination at the Portland Harbor site. Hence, estimated risks and hazard from PBDEs ultimately need to be incorporated into the tables presenting cumulative risks and hazard for the different exposure scenarios.

5. Based on the Infant Risk Adjustment Factors (IRAFs) presented for PBDEs, it appears that the half-life for these chemicals in the human body is assumed to be the same as that for PCBs. We presume this will be discussed in the text of the revised BHHRA. Otherwise, at a minimum, it should be clarified in a footnote to the tables.

6. The IRAFs presented in Appendix D of the OR DEQ guidance are based on an average daily dose to the mother. Accordingly, calculating infant cancer risk using the IRAFs in conjunction with the combined child/adult cancer risk is technically incorrect. The uncertainties of calculating infant risks using the combined child/adult risk estimates versus using the dose to the mother alone should be discussed in the revised BHHRA.

7. The revised tables show calculated risk for total Aroclors, total PCB TEQs, and total adjusted PCBs, which are defined as total Aroclors minus the sum of dioxin-like PCB congeners (PCB TEQs). Accordingly, total PCB risks would be calculated as the sum of adjusted PCBs and PCB TEQs. While this is the case in certain tables (fish consumption), in other instances (in-water sediment exposures), PCB risks are expressed as the sum of total PCBs plus PCB TEQs. This latter methodology will include risks from dioxin-like PCB congeners in both as total Aroclors and as PCB TEQs. EPA understands that the representativeness of certain data may be such that the latter approach is considered more appropriate in certain instances, but a review of the draft BHHRA revealed no clear criteria for choosing one method over another. The revised BHHRA should include a discussion clarifying the rationale for each methodology, and a footnote should be included in the appropriate tables specifying which technique was used.

8. As previously noted in an email to the LWG, it appears the formula used to calculate Child Cancer Risk in Table 5-71 contains an error that results in CTE cancer risks being presented instead of RME estimates. LWG has indicated they are aware of the error and will correct it prior to submitting the revised BHHRA.

9. The titles of some of the revised tables (Tables 5-50 and the following tables, and Table 5-155 and the following tables) state that cancer and noncancer risks are presented, while in fact only cancer risks are shown. The titles should be corrected as needed to avoid confusion.